

Comment A

the resistor string is free of stress migration voids. A stress migration void can be detected by placing a tolerance on the measured impedance between any two adjacent taps of the stress migration test structure, as compared to an ideal expected impedance, or an average of the individual resistor impedances where the taps are uniformly spaced. The magnitude of the tolerance is one factor in determining the size of stress migration voids detected. The tolerance is determined empirically by determining the minimum stress migration void size for maintaining mechanical integrity of structural materials surrounding the void, by acceptable degradation in electromigration design rules, and by acceptable change in resistance according to electrical design consideration. Typically, 25 percent line width or cross-section penetration is the maximum allowable void size. The number of resistors, R_n , in the runner of stress migration test structure 10 is dependent on the probability of growing a void in any unit of runner length, which depends on the microstructure of the metal including the crystallographic grain size (local ordered arrangement of atoms, e.g., cubic symmetry, face-centered cubic, body-centered cubic, hexagonal, etc.) thickness of the metal, mechanical stress for barrier layer, anti-reflection coatings on top of runner, and modulus for dielectric coating overlying the metal runner.--

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Please replace the paragraph beginning on page 10, line 8, with the following rewritten paragraph:

--Using the Kelvin sensing measurement technique described above, starting at one end of the stress migration test structure and using four taps, apply a known current between the outer two of four probes and measure the developed voltage between the two inner probes, then compute and store for subsequent processing the impedance of the second segment of the stress migration test structure. Note when using the Kelvin method, the first segment is unavailable for measurement. If the taps, where the probes will contact, are arranged in a pattern, an automated probe positioning tool can be used to step through the taps to measure the impedance of the segments of the stress migration test structure 10 or 210. To step to a new group of taps, apply a current, measure the developed voltage, determining the impedance by application of Ohm's law, and store the impedance. This technique is repeated until the impedance of all but the last segment of the stress migration test structure have been recorded. The last segment of the stress migration test structure